

WHAT IS CLAIMED IS:

1. A method of manufacturing a turbine bucket comprising:
  - (a) investment casting the turbine bucket with a single crystal alloy; and
  - (b) tuning a natural frequency of the turbine bucket without modifying physical features of the turbine bucket.
2. A method according to claim 1, wherein step (b) is practiced by tuning the natural frequency of the turbine bucket without affecting turbine bucket weight.
3. A method according to claim 1, wherein step (b) is practiced by tuning the natural frequency of the turbine bucket without affecting turbine bucket shape.
4. A method according to claim 1, wherein step (b) is practiced by tuning torsional and stripe mode frequencies without affecting flexure mode frequencies of the turbine bucket.
5. A method according to claim 1, wherein step (b) is practiced by, prior to step (a), placing a crystal seed along a desired direction according to an orientation relative to an engine axial direction.
6. A method of tuning turbine bucket natural frequency comprising:
  - (a) placing a crystal seed along a desired orientation relative to an engine axial direction; and
  - (b) investment casting the turbine bucket with a single crystal alloy, wherein the desired orientation is selected to tune torsional frequencies without affecting flexure frequencies.
7. A method according to claim 6, comprising tuning the natural frequency of the turbine bucket without affecting turbine bucket weight.

8. A method according to claim 6, comprising tuning the natural frequency of the turbine bucket without affecting turbine bucket shape.